REMARKS

Favorable reconsideration and allowance of this application are requested.

1. Discussion of Amendments

By way of the amendment instructions above, the pending claims have been amended so as to clarify the same and to address the various informalities noted by the Examiner. In addition, it will be observed that pending claim 1 has been revised so as to emphasize that each of the spinholes has a geometry comprising a contraction zone having a gradual decrease in diameter from a diameter D_0 to a diameter D_n and a cone angle in the range 8-17°. In view of this amendment to claim 1, the corresponding recitation has been deleted from claim 3.

Claim 14 has been amended so as to be recast in independent form and to further specify the geometry of the spinhole to comprise an inflow zone of constant diameter of at least D_0 and a length of L_0 with a ratio L_0/D_o of at least 5. Basis for this amendment can be found, for example, in original claim 9 (which constitutes its own "disclosure") and on page 5, lines 9-11.

Therefore, following entry of this amendment, claims 1-15 will remain pending herein for which favorable reconsideration and allowance are solicited.

2. Response to Claim Objections and Rejections Under 35 USC §112, 2nd ¶

The amendments presented above with respect to pending claims 1-15 are believed to address all of the noted objections noted by the Examiner as well as the informalities which formed the basis of the rejection of claims 3, 7-11 and 13 under 35 USC §112, 2nd ¶. Withdrawal of the same is therefore believed to be in order.

3. Response to 35 USC §103(a) Rejections

Prior claims 1-8, 12 and 14-15 attracted a rejection under 35 USC §103(a) as allegedly being "obvious" and hence unpatentable over Kavesh (USP 6,448,359). In addition, prior claims 9-11 and 13 attracted a rejection under the same statutory provision as unpatentable over Kavesh and further in view of Chau (USP 5,296,185). As will become evident from the following discussion, neither Kavesh nor Chau is appropriate as a reference against the claims now pending herein for consideration.

In this regard, applicants note that Kavesh discloses a method of preparing multi-filament yarns, comprising the steps of: extruding a solution of polyethylene and solvent through a multiorifice spinneret into a cross-flow gas stream to form a multi-filament fluid product, stretching the multifilament fluid product, quenching the fluid product in a quench bath to form a gel product, stretching the gel product, removing the solvent from the gel product to form a xerogel product and stretching the xerogel product.

Kavesh indicates that the draw ratio in and the dimension of the air-gap are critical parameters that determine properties of the filaments and yarn. No mention is made on controlling the draw ratio *in the spinholes*. The drawback of the Kavesh process is that small variations in air-gap draw ratio and dimension will result in process instabilities.

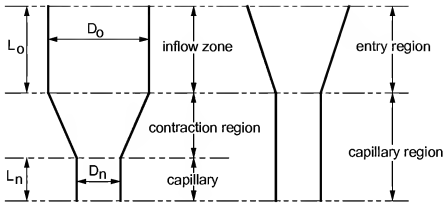
In contrast, the present invention employs a spin hole having a geometry comprising a contraction zone, with a gradual decrease in diameter from diameter D_0 to D_n with a cone angle in the range 8-75°. Such a spinhole geometer allows drawing to be acheived *in the spinhole*. Moreover, the draw ratio in the spinhole can be much better controlled as compared to the draw ratio of the drawing in air (i.e., as proposed by Kavesh). This better draw ratio control in turn allows for the fluid draw ratio DR_{fluid} to be better controlled as compared to drawing only in the air gap (i.e., as proposed by Kavesh).

Kavesh does not provide any hint at controlling DR_{fluid} by controlling the dimensional geometry of the spinhole. In addition, no spinhole is in fact disclosed in Kavesh having a contraction zone with a gradual decrease in diameter from diameter D_0 to D_n with a cone angle in the range 8-75°.

In this regard, the examiner's attention is drawn to Figure 2 of Kavesh and the text describing Figure 2 at column 4, lines 48-55 therein. As noted, the spinneret hole has a ***tapered entry region*** and a ***capillary region of constant cross section***. When the ordinarily skilled person reads an entry region, he would not understand it as the contraction zone as is defined in the appilcants' pending claim 1. Instead, the ordinarily skilled person would understand that reference to an "entry region" mean a region for the spinning solution to enter the region from which the spinning solution is extruded, i.e. the capillary region downstream of the entry region.

The entry region referred in Kavesh is only mentioned as "tapered". There is no teaching or suggestion for actually drawing of the UHMWPE in such region. This is further evidenced by the fact that there is no mention made of the angle of the taper, in contrast to the detailed description of the dimension of the capillary region. This really is not a surprise since, as noted above, an ordinarily skilled person would recognize that the actual region which extrudes the spinning solution is the capillary region, and not the entry region. From Kavesh, therefore, the ordinarily skilled person would not be taught to make a ***contraction zone for the purpose of drawing*** the UHMWPE as is defined in applicants' pending claim 1. Moreover, such a person would not therefore specifically choose the cone angle of the contraction zone to be within the range of 8-75°.

A drawing is shown below to further illustrate the structural differences between the presently claimed invention and Kavesh:



Present invention KAVESH

As is illustrated above, the spinplate of Kavesh does not have a contraction region as is defined in the pending claims herein -- it only has an entry region.

Furthermore, Kavesh is silent about the draw ratio $DR_{fluid} = DR_{sp} \times DR_{ag}$ of at least 50. The comparison of the experiments according to the present invention and the results of Kavesh as illustrated in Fig. 1, clearly shows the advantage of the present invention which is not suggestion or even remotely taught by Kavesh..

Chau discloses a process to spin a fiber from a liquid-crystalline dope that contains a solvent polyphosphoric acid and a lyotropic polybenzazole polymer. Chau does not relate to a process for making high-performance polyethylene multifilament yarn. Chau also does not disclose a fluid draw ratio $DR_{fluid} = DR_{sp} \times DR_{ag}$ of at least 50.

Chau discloses a spinneret containing a plurality of holes, each hole containing an inlet, a transition cone, a capillary section and an exit. The length of the capillary section is preferably no more than about 10 times the diameter of the capillary, more preferably no more than 5 times, most preferably no more than 3.5 times.

Chau is silent about the dimension of an inflow zone of constant diameter D_0 and a length of L_0, with a length/diameter ratio L_0/D_0 at least 5. Unlike Chau, the present

invention employs this feature which gives the advantage that the polymer molecules in the solution can at least partly relax such that pre-orientation originating from upstream flow fields can diminish or disappear (see, page 5, lines 11-13 of the original specification).

Thus, the pending claims herein are patentably *un*obvious over Kavesh alone or taken together with Chau. Withdrawal of all rejections under 35 USC §103(a) is therefore in order.

4. Fee Authorization

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

Respectfully submitted,

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